“MyGreenservices, un projet en mode “ living lab ” piloté par Inria Sophia Antipolis relatif à la co-création de services environnementaux basés sur des capteurs (citoyens, Ville de Nice)”

Brigitte Trousse

«MyGreenservices, un projet en mode « living lab » piloté par Inria Sophia Antipolis relatif à la co-création de services environnementaux basés sur des capteurs (citoyens, Ville de Nice)»

Brigitte TROUSSE

Chercheur Inria (Sophia Antipolis)

& Représentante Inria du LL ICT Usage Lab

& Coordinatrice coté français du projet CPCFQ

- Institut national de recherche sous double tutelle ministérielle (Industrie et Recherche)
- menant des recherches en Informatique et Mathématiques, sciences qui jouent un rôle central dans la « révolution numérique » actuelle
- Devise Inria: « **mettre l'excellence scientifique au service du transfert industriel et de la société** »

Brigitte Trousse

- **Chargée de recherche Inria** (Sophia Antipolis) en Intelligence Artificielle et en fouille de données appliquée à l'analyse des usages. **Ex-responsable scientifique de l'équipe-projet AxIS** www-sop.inria.fr/axis
- Conduite du projet expérimental MyGreenServices en mode « laboratoire vivant » – Données environnementales (qualité de l'air, bruit) -> article atelier.net
- Impliquée dans la communauté nationale et européenne des living labs depuis 2007-2008. **Présidente de l'association France Living Labs** , partenaire de l'association ENoLL (European Network of Living Labs) et co-responsbale **du LL ICT usage Lab (1ère vague ENoLL), membre du conseil d'adminsitration d'ENoLL**
- **Coordinatrice coté français du projet CPCFQ Francophonie Living lab**

A. Dimensions d'un Living Lab

B. Exemple de MyGreenServices dans le cadre du projet européen ELLIOT (2010-2013)

A.1 Un environnement, des ressources:

- tiers-lieu, fablab, espace de co-working, cantine, EPN, Usage/Experience Lab

… i.e des infrastructures physiques

+ infrastructures technologiques

+ des communautés d'usagers, …

©Lorraine Smart Cities Living Lab - Nancy

A.2 Une méthodologie Living Lab (co-création avec les usagers), i.e. des projets en mode « living lab » dans le living lab, des cycles courts (des idées à des représentations concrètes)

©Lorraine Smart Cities Living Lab - Nancy

A.3 Et un <u>écosystème</u> PPPP (Partenariat Public-Private-People)

A. Dimensions d'un Living Lab?

B. Exemple de MyGreenServices dans le cadre du projet européen ELLIOT (2010-2013)

Co-conception
avec les citoyens
et professionnels
de services verts
projet européen FP7 ICT ELLIOT)

MyGreenServices
Portail citoyen de l'air azuréen

B.1 Introduction

MyGreenServices
Portail citoyen de l'air azuréen

Knowledge
- Increase awreness on IoT paradigm
- Update knowledge on the impact of air quality in daily lives

Social
- Generate enthusiasm for IoT based services
- Improve interest for air quality measurement
- Provide trustful services
- Foster citizen involvement in air quality measurement
- Encourage collaborative tagging and information sharing

Business
- Provide robust, relevant and customised environmental information
- Provide easy to use and engaging green services
- Change citizen behaviour towards a more sustainable lifestyle
- Respect citizen privacy and confidentiality

ICT USAGE Lab

Inria INVENTEURS DU MONDE NUMÉRIQUE

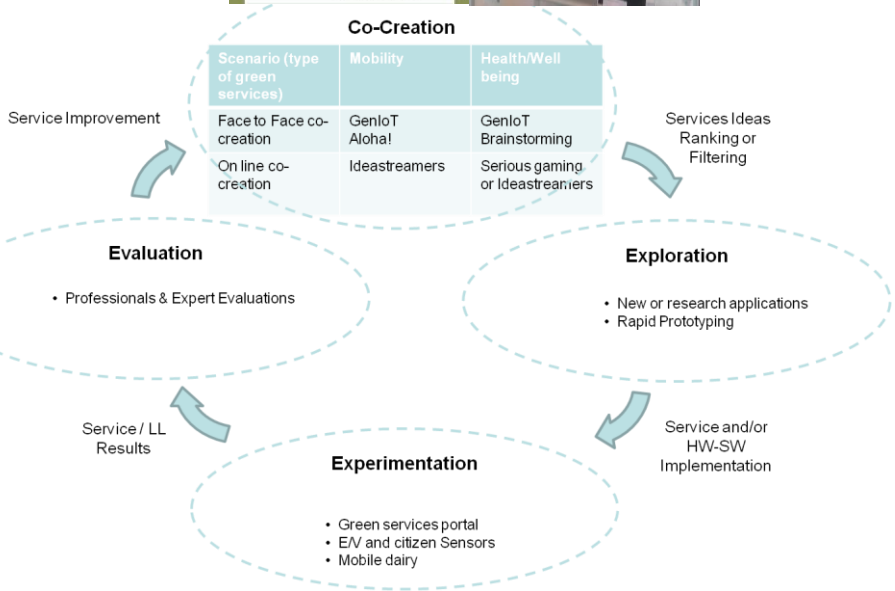
fing

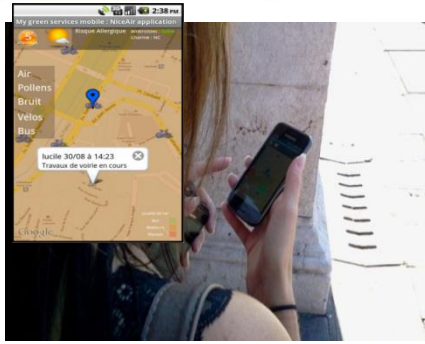
VULOG

8

B.2 Processus déployé (2 itérations)

MyGreenServices
Portail citoyen de l'air azuréen

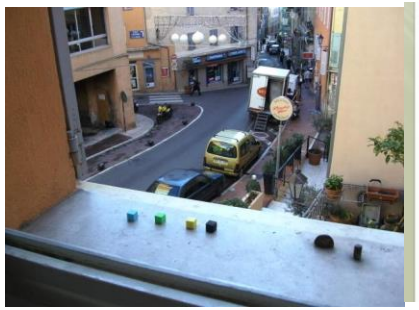




ICT USAGE Lab

B.3 Co-création - Exploration : scénario Santé & Bien-être

Génération d'idées
Forums + Gamification



Storysteling

Smart object
& service design

B.4 Implémentation Evaluation

MyGreenServices
Portail citoyen de l'air azuréen

Capteurs citoyens
et voiture MIA équipée de Nice

2 versions
De la plate-forme
(My Green Services)

7 Prix « Smart Citizen », Innovative City 2013, Nice

ICT USAGE Lab

Inria INVENTEURS DU MONDE NUMÉRIQUE

B.5

MyGreenServices
Portail citoyen de l'air azuréen

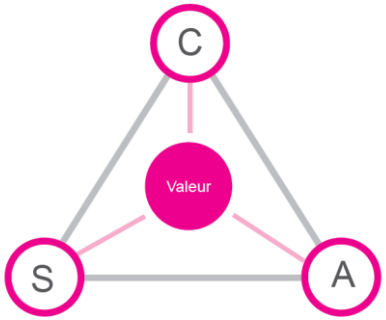


Figure 6. Modèle de création de valeur C-S-A

KSB Experience Model

Knowledge Dimension

Perceptual Experience
- Sensory (Sensitivity)
- Perceptive Appreciation (Perceptivity)

Cognitive Experience
- Cognitive metaphor (Comprehensibility)
- Cognitive ergonomics (Cognitivity)
- Cognitive Induction (Reflexivity)

Reciprocal Experience
- Distributed Cognition (Transductivity)
- Situated Cognition (Situativity)

Social Dimension

Interpersonal Experience
- Ties (Connectivity)
- Interaction (Interactivity)
- Group dynamics (Collectivity)
- Group Enhancement (Reciprocity)
- Trust (*People* Reliability)

Cultural & Empathical Experience
- Habits (Customability)
- Conventional (Normability)
- Cultural behaviour (Community)
- Caring (Empathy)

Emotional Experience
- Physiological state (Arousability)
- Emotional Connection (Affectivity)

Business Dimension

Technological Experience
- Innovativeness (Creativity)
- Performance (Conformability)
- Friendliness (Usability)

Economical Experience
- Satisfaction (Favourability)
- Inclusion (Suitability)

Legal & Ethical Experience
- Ownership (Recognition)
- Privacy (Protection)
- Trust & Security (Trustability)

ISO 9241-210 Elements of User Experience

ICT USAGE Lab

Inria INVENTEURS DU MONDE NUMÉRIQUE

B.6 Evaluation

Step 1: Instantiating KSB model

Step 2: **Defining relevant heterogeneous data**
:

- Qualitative: Questionnaires (4 types), interview(1),
- Quantitative (4 types): Logs of *MyGreenServices (2x16 days)*, Logs from gamified forum (2x16 days), Contents of the forum, IoT data (more than 4 milions of measures)

Step 3: **Defining the rules**

Step 4: Collecting during the experiment and Pre-processing data inside the living Lab, mainly with **FocusLab server**
With the objective to study ithe relevant of its generic IoT dedicated methods (D4.3.3 8).

Step 5: Sending the data to Elliot

	Ref	KSB Properties	*Input*	*Indicators with weighting*
Knowledge	K2.2	Sensing affordances	Questionnaires (profiling and Q4)	Air quality knowledge
	K3.2	Cognitive artefact	Questionnaire (Q4), Log, Interview	Environment evaluation (0.2), Change in activity (0.4), IoT Data comparison (0.4)
Social	S1.1	Social Networking and openness	Questionnaire (Q2), Log	Level of activity, Frequency of connections, Forum statistics
	S2.1	Communication	Interview	Number of MGS demonstrations
	S5.1	Attractiveness	Questionnaire (Q4), Log	Number of intended recommendations, Number of effective recommendations, Frequency of connections after experiments
Business	B2.1	Reliability	Questionnaire (Q2), Log	Perceived data reliability, Frequency of connections
	B3.1	Ergonomic quality	Questionnaires (Q2, Q1.1 and Q1.2), Log	General findability Forum findability (0.5), Opinion alert service (0.25), Intuitivity of alert service (0.25)
	B4.1	Usefulness	Questionnaire (Q1.2), Log, Interview	Alert programmation, Change in habits, Alert logs
	B4.2	Hedonic quality	Questionnaires (Q1.1, Q1.2 and Q2)	Opinion MGS (0.5), Reaction to alert service (0.25), Opinion forum (0.25)
	B4.5	Loyalty	Questionnaires (Q4 and Q1.1), Log	Intention of use, Frequence of connections (perceived), data logs connections and users sessions
	B6.1	User ideas	Interview, Log	Number of new services, Forum statistics
	B7.1	Data protection	Questionnaire (Q4)	Data protection (perceived)

MyGreenServices
Portail citoyen de l'air azuréen

New model
12 KSB properties

Use of 3 types of UX:
- Momentary UX (aleatory)
- Episodic UX (4 sessions)
- Cumulative UX (2 times)

ICT USAGE Lab

Inria INVENTEURS DU MONDE NUMÉRIQUE

B.7 Exemples de règles

S1.1 Social Networking and openess = high (expe1)

If %users inactive > **90%** then S1.1= low
If %users proactive > **2%** then S1.1 = high
S1.1 = Medium for the rest

Thresholds: common rule

Questionnaire Q2 (did MGS encourage you to participate and share knowledge?)
And logs (frequency of connexions, statistics froom the forum)

B7.1 Data protection : high

To compute this property, we use two indirect questions:
Q4/Q14: do you feel that your personal data are protected by *MyGreenServices*
Q15: please specify

B.7 Exemples de résultats

S5.1 Attractiveness: High (expe 1)

To compute this property, we use the user answers to two indirect questions (Q7, Q9) from questionnaire Q4.

•Q4/Q7: Would you recommend the portal to your friends?
•Q4/Q9: Have you recommended MyGreenServices to your friends / acquaintances?

	Q7 Yes	Q7 No
Q9 Yes	77,80%	0
	high	medium
Q9 No	22,20%	0
	medium	Low

B.7 (suite) Exemples de résultats

KBS Results Experiment 2

Improvment of mainly 3 KSB properties (already high)

B2.1 Reliability

judgement of IoT data (100% instead of 75%)

S1.1 Social networking and Openess

(57% instead of 50%)

B7.1 Data protection high as in expe 1

B.8 Lessons Learnt

Success factors

- Participants were **aware of air quality awareness**. The awareness can be considered as a first step in the **behavior changing process.**
- Elaboration of a **community of 50 active contributors** (citizen/ professionals, co-creators/data producers).`3 seroius games, Importance of community management
- UX Improvement of the second version *MyGreenServices* based on user feedback which is very helpful
- Deployment of a complete living lab process involving citizen and applying Ksb model to measure experience at each step based on both qualitative and quantitative data
- Environmental sensors/devices

Challenges

- New smart low cost environmental sensors and devices
- More studies for UX measurement supports towards more advanced KPIs linked to advanced data analysis methods and linked to user IoT contexts
- Make sustainable such a open data portal: experiments on new economic models with more sensors and more citizen-

Références

1. www.atelier.net – Juin 2013

Accueil › Tendances › Articles > [Innovative City] Le citoyen se veut ...

[Innovative City] Le citoyen se veut chercheur, co-créateur et testeur de la ville intelligente

Par Ruolin Yang | 19 juin 2013 | Laisser un commentaire

Mots-clés : Smart city, Société & Usages, City, France, Brigitte Trousse, Carlos Moreno, Europe

Tweeter 84 | +1 5 | Recommander 40 | Share 8 | 0

Au centre d'un projet européen, le citoyen, qui n'est plus seulement sollicité pour ses besoins et ses idées mais également pour la collecte de donnée, l'analyse et les experiences destinés à promouvoir la ville intelligente et durable.

2. B. Trousse, M. Pallot, C. Tiffon. **Co-creating environmental Services based On Pollution citizens Sensing.** In Interdisciplinary Studies Journal – Special Issue on Smart Cities, Vol. 3, No. 4, **2014** (ISSN 1799-2710), pp331-351.

Co-Creating Environmental Services Based on Pollution Citizen Sensing

Brigitte Trousse, Inria Sophia Antipolis - Méditerrannée, France,
Marc Pallot, University of Nottingham Business School, United Kingdom,
Caroline Tiffon, Inria Sophia Antipolis - Méditerrannée, France

Abstract

This paper describes an Open Innovation case study within the European project ELLIOT - Experiential Living Lab for Internet of Things (IoT). In this context, our lab aimed at co-creating green services with a set of stakeholders on air quality and noise measurement on Nice Côte d'Azur (NCA) territory via citizen sensing. Our objectives dedicated to Transport and Health scenarios are:

- Raising public awareness by involving citizens in collecting environmental data and creating a community of empowered citizens;
- Providing solutions that can reduce the environmental impact;
- Alerting the community in case of exceeding the thresholds recommended by the EU.

After introducing the context and the problem, we will first present the main related concepts and works before starting the ELLIOT project. Then, we present our approach for co-creating with citizen environmental IoT-based services, which is based on an eXperiential Design (XD) process, a new Ideation methodology dedicated to IoT and finally our User eXperience (UX) model and measurement methodology related to MyGreenServices portal we implemented. Before concluding about MyGreenServices in order to make it sustainable on the chosen Territory, we describe the main outcomes of this pilot, both issued from the XD process as well as the UX measurement.

Keywords

Citizen Sensing, User Experience, Experiential Design Process, Co-creation, Service Design, Internet of Things (IoT), Living Lab, Smart Cities, Green Services, Environment, Air Quality

Introduction

This paper describes an Open innovation case study managed by the Ax1S team from Inria (http://www-sop.inria.fr/axis/) within the ICT Usage Lab (labelled by ENoLL in 2006 and located in the South-East of France) applied to the co-creation of IoT-based green services (in our green use case, air quality and/or noise) within the European FP7 ICT project named ELLIOT - Experiential Living Lab for Internet of Things (www.elliot2project.eu).

Merci
pour votre attention

www-sop.inria.fr/axis

http://fr.slideshare.net/F2L-FranceLivingLabs/

https://www.researchgate.net/profile/B_Trousse/contributions